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ABSTRACT

Teachers average a decision every two minutes when they are teaching. The kinds of decisions they make affect their students. One hundred twenty-two undergraduate and graduate education majors were tested to explore what decision they would make when confronted with problem statements related to the planning and delivery of instruction. The test consisted of 14 typical comments that might be heard from students during or after studying a particular topic. Each of the seven components of an effective instructional plan was inferred as missing two different times. Half of the tests contained a short description of the seven components--motivation, objectives, prerequisites, information and examples, practice and feedback, testing, enrichment, and remediation. The remaining half of the tests gave a listing of the seven components without any descriptions. Results indicated that experienced teachers without the benefits of formal instructional design training were better able to identify problem situations and choose the appropriate missing component than novice teachers. Instructional design principles can help teachers recognize problems and make appropriate changes in their instruction. Two data tables and a copy of the test are appended. (8 references) (Author/BBM)

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Title:

Experienced and Novice Teacher Differences in Identifying Instructional Problems

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Abstract

Teachers average one decision every two minutes while they are teaching. The kinds of decisions they make affect their students. One hundred twenty-two undergraduate and graduate education majors were tested to explore what decisions they would make when confronted with problem statements referring to the planning and delivery of instruction. Results indicated that experienced teachers were better able to identify problem situations and choose the appropriate missing component than novice teachers. Instructional design principles can help teachers recognize problems and make appropriate changes in their instruction.

Introduction

It has been proposed that if instructional design (ID) principles were incorporated into the classrooms by teachers, "students would become motivated, instruction would become clear and logical, student achievement would increase, teachers would be freed from the drudgery of routine tasks, and classroom activities would become more varied" (Kerr, 1989 p. 7). This would be accomplished because ID presents alternatives to traditional teacher-based instruction and research has shown that utilizing the process creates an effective means of planning classroom instruction. However, at present most classroom teachers have not received formal training in the procedures commonly used by instructional designers. If ID is to help novice teachers move from a stage of being basically reactive (Kerr, 1981) to a point where they become more skilled in handling the "information processing load and decision making during interactive teaching" (Walter, 1984 p. 8), these basic principles must be taught in current, formal, teacher training programs.

Davis and Silvernail (1983) concluded from their national study of recognized curriculum experts that "curriculum design and instructional design skills are viewed as essential parts of teacher preparation programs but that not all of these skills are actually represented in the curricula of such programs." Reiser (1989) goes on to predict by the year 2001 "it is likely that teachers in the public schools will pay more attention to design principles, but it is unlikely that the school systems will employ many instructional designers."

One model for planning effective instruction propounded by Dick and Reiser (1989) consists of the following seven components in order: motivation, objectives, prerequisites, information and examples, practice and feedback, testing, enrichment and remediation. Research suggests that this sequence of events results in the most efficient and effective approach to learning (Dick & Reiser, 1989). It was hypothesized that if teachers - both novice and experienced - were given a short description of these seven components they would be better able to make instructional decisions.

To determine the kind of instructional decisions teachers make when faced with everyday situations, an instrument containing the seven components of an instructional plan with a short description and an additional instrument containing the seven components without a description was used. This was accompanied by 14 typical classroom scenarios for the teachers to read and make a decision regarding which component may be missing.

The Current Study

The purpose of this study was to examine the ability of novice and experienced teachers - not formally trained in ID principles - to identify the components of effective instructional plans. This is in response to a growing trend in the public schools that requires teachers to use, or at least be aware of, some of the basic principles of instructional design.

Method

Subjects

The subjects were 122 undergraduate and graduate education majors from a large southwestern university. Sixty-two subjects were identified as novices (two or less years of teaching experience, $\bar{x}$ = .23 years) and sixty were identified as experienced (three or more years of teaching, $\bar{x}$ = 7.45 years). Among the novices, 13 were early education majors, 31 elementary, 15 secondary, and three special education. Among the experienced teachers, five held degrees in early education, 17 in elementary, 30 in

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secondary, and eight in special education. All of the subjects were enrolled in a basic teacher preparation class which must be taken at the beginning of their education block. In addition, all of the subjects were volunteers and were not given any extra points for participating.

Materials

An instrument was developed containing 14 typical comments that might be heard from students during or after studying a particular topic. Each of the seven components in an effective instructional plan (Dick & Reiser, 1989) was inferred as missing two different times.

Half of the instruments contained a short description of each of the seven components - motivation, objectives, prerequisites, information and examples, practice and feedback, testing, enrichment and remediation. The remaining half of the instruments gave a listing of the seven components but did not contain any descriptions. A larger number of the test materials than subjects was provided.

Procedures

Materials were distributed so that approximately one half of the subjects would receive an instrument with a short description of the components, plus the 14 comments and the remainder would receive instruments with a only list of the components, plus the 14 comments.

All of the subjects participated in groups within their respective classroom setting. Subjects were randomly assigned to the two conditions - descriptions/no descriptions - based on their seating order. Thirty-two of the novices and 28 of the experienced teachers received test materials with definitions. Thirty of the novices and 32 of the experienced teachers received test materials without definitions.

Subjects were instructed to read each comment and choose which one of the seven components may be missing from the instructional plan. A typical comment reads "I studied and studied, but I never really understood what it was I was supposed to be learning". The missing component in this example shows that the teacher had not made the objective clear to the student. Subjects were informed that there was no time limit and were encouraged to take as long as they felt they needed.

Criterion Measure

An instrument was developed based on the examples given in Planning Effective Instruction (Dick & Reiser, 1989, p. 82-83). Fourteen comments which might be heard from a student in a typical classroom setting were given/constructed to reflect the absence of one of the seven components described as essential to an instructional plan. There were two comments per component. The instrument was given to graduate level instructional design students to test the reliability between the two sets of comments - those created by the author and those used by Dick and Reiser. The resulting measure of equivalence and stability was .99. The number of correct responses (14 possible) to the comments was used as the criterion measure for data analysis.

Design and Data Analysis

The design was a 2(experience) x 2(definition) factorial. An analysis of variance (ANOVA) was used to analyze the data from the experiment.

Results

The mean scores by treatment are shown in Table 1 (the overall mean performance score was 8.21 out of 14 possible). Experienced teachers had a mean score of 9 out of a possible 14. Novice teachers had a mean score of 7.5. The average score for subjects in the two description groups was 8.35 compared to 8.06 for subjects in the no description groups. Items missed by more than 50% of novices pertained to objectives, testing, and enrichment/remediation. The only items missed by more than 50% of experienced teachers pertained to enrichment/remediation.

Insert Table 1 about here

A preliminary analysis was conducted using analysis of variance (ANOVA) procedures to determine the effects of experience and component descriptions on performance. Alpha was set at .05 for all statistical tests.

Insert Table 2 about here

Analysis of the posttest data indicated that giving a short description of each of the seven components did not significantly affect performance $F(3, 118) = .541$ $p > .05$.

Results did indicate a significant difference between experienced and novice teachers for identifying the components missing from an effective instructional plan $F(3, 118) = 10.67$, $p < .001$.

Discussion

The purpose of this paper is to describe the results of a study conducted to determine the ability of teachers (novice and experienced) to identify basic components of an instructional plan. There are numerous instructional design models to assist in the task of designing classroom instruction and making effective decisions concerning its implementation. These models have long been available to instructional designers, yet teachers are expected to learn ID principles through a process of trial and error in the daily classroom setting. This study provides the basis of an argument for incorporating instructional design principles into preservice and inservice teacher preparation programs.

The results of this study suggest that experienced teachers - without the benefits of formal instructional design training - develop an ability to identify ID problems in an instructional plan. This was evidenced by the significantly higher performance of the experienced teachers in identifying instructional problems, a basic step in instructional design. An obvious explanation might be that teachers do more than merely deliver or implement instruction (Snelbecker, 1987). In fact, Clark and Peterson (1986) determined that teachers average at least one instructional decision every two minutes. With such a significant amount of daily practice in making instructional decisions, it appears that many teachers acquire bits and pieces of the information pertaining to effective instruction that could and should be presented to them in the teacher education programs.

The variable of providing short descriptions of the components appeared to make very little difference to both the novice and experienced teachers. This was probably due to the simplistic nature of the component names themselves. Generally, teachers - novice and experienced alike - have been exposed to such labels as motivation, objective, prerequisites, etc. in their teacher education programs, parent-teacher conferences, work

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settings or otherwise, and therefore the component names themselves and their meanings were easily understood by the subjects.

Future research in this area might focus on the components that were understood the least - objectives, testing, enrichment/remediation - and therefore make up for the majority of the errors in the results of this study. Also, what is the best method for incorporating instructional design into teacher preparation programs and how much overlap should there be in teacher preparation and instructional design programs?

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Table 1

Mean Performance Scores by Teacher Experience and Presence of Description

	Presence of Description		
Level of Teacher Experience	Description	No Description	Total
Novice			
M	7.59	7.33	7.46
SD	2.08	2.36	2.2
Experienced			
M	9.11	8.78	8.95
SD	1.69	1.68	1.68
Total			
M	8.35	8.06	8.21
SD	2.04	2.15	2.09

Note. n=62 for novices; n=60 for experienced. All scores are out of a maximum of 14 possible.

Table 2

ANOVA Summary Table for Teacher Performance

Source of Variation	SS	df	MS	F	p
Main Effects	44.871	2	22.436	5.516	.005
Definitions	2.201	1	2.201	.541	.463
Experience	43.404	1	43.404	10.672	.001
Definition X Experience	1.886	1	1.886	.464	.497
Explained	46.757	3	15.586	3.832	.012
Within Cells	479.907	118	4.067		
Total	526.664	121	4.353		

Answers to Test Comments

1. E - Practice and Feedback
2. A - Motivation
3. G - Enrichment
4. D - Information and Examples
5. F or E - Testing or Practice and Feedback
6. C - Prerequisites
7. B - Objectives
8. E - Practice and Feedback
9. A - Motivation
10. B - Objectives
11. F - Testing
12. C - Prerequisites
13. D - Information and Examples
14. G - Enrichment and Remediation

PLANNING EFFECTIVE INSTRUCTION

WHAT AREA OF TEACHING IS YOUR SPECIALTY? (Circle one)

Early Childhood Elementary Secondary Special Education
Other_____

HOW MANY YEARS OF TEACHING EXPERIENCE DO YOU CURRENTLY HAVE?_____.

WHAT IS THE HIGHTEST DEGREE YOU HOLD?_____

Listed below are some typical comments that might be heard from students during or after studying a particular topic. Based upon each comment, decide which instructional activity may have been missing from the instructional plan used by the teacher. For example, if a student said *"I studied and studied, but I never really understood what it was I was supposed to be learning,"* we would imagine that the student did not understand what the objective of the lesson was. Apparently, the teacher had not made the objective clear to the student. Now look at each of the comments below, and decide what instructional event may have been missing.

Labels and definitions for the seven instructional activities that are included in an instructional plan:

A. MOTIVATION - activities undertaken before, during, and following instruction to gain and maintain student interest.

B. OBJECTIVES - informing students of what it is that they are going to be able to do when they finish the instructional process.

C. PREREQUISITES - skills, knowledge, and attitudes students must have in order to begin your instruction.

D. INFORMATION AND EXAMPLES - information that must be presented to the learners, or information that the learners must discover, before they can perform the behavior described in the objective and examples of how they can use the information.

E. PRACTICE AND FEEDBACK - activities directly related to the skills, knowledge, and attitudes reflected in the objectives, and the information a learner receives regarding the answer provided.

F. TESTING - determining the student's ability to perform the skill stated in the objective.

G. ENRICHMENT AND REMEDIATION - remedial activities are directly targeted on the problems demonstrated by students in the original instruction, enrichment activities extend the students' knowledge of a topic or challenge them to apply it in interesting situations.

Please turn the page.

Write the letter of the instructional activity you believe is missing on the line in front of the comment.

_____ 1. "I turned in my answers to the homework problems he gave us, but I never found out how well I did."

_____ 2. "I have no idea why we are studying this topic. It doesn't seem to have anything to do with anything I'm interested in.

_____ 3. "We've moved on to Unit three and I still don't understand the stuff from Unit two!"

_____ 4. "We spend a lot of time working on some activities, but I was never clear about exactly what the formula was that we were supposed to be applying. If he had just shown us how to use the formula, maybe I could have done better."

_____ 5. "We go from lesson to lesson, but we never find out if we are really mastering what we're supposed to be learning. I'm really concerned about what's going
to happen at the end of the year if we have a comprehensive final exam."

_____ 6. "I listened as closely as I could to what the teacher said in class, but I didn't understand what he was talking about. I seem to be missing something that I should know to understand this topic."

_____ 7. "I thought we were going to be able to use our textbook when we had to answer those questions. When I got to class I found out we had to do it from memory."

_____ 8. "I have to wait the whole semester until report cards to find out if I'm passing or failing."

_____ 9. "When I finish school I plan to work for my Dad. This stuff is just a waste of time."

_____ 10. "I never know what to study for the test."

_____ 11. "He taught us one thing but tested us on another."

_____ 12. "My new teacher is expecting me to know this stuff, but I can't remember anything about it from my old school."

_____ 13. "We were supposed to compare the cost of foods per package, but we never were told how to figure the cost per unit."

_____ 14. "The formula was easy to understand and apply in the classroom. I wish she would have given us some real-life situations to apply it to."

Thank you for completing this survey.